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(56) Documents Cited

GB 2230661 A US 5444429 A

(58) Field of Search

UK CL (Edition Q) H2H HAPB

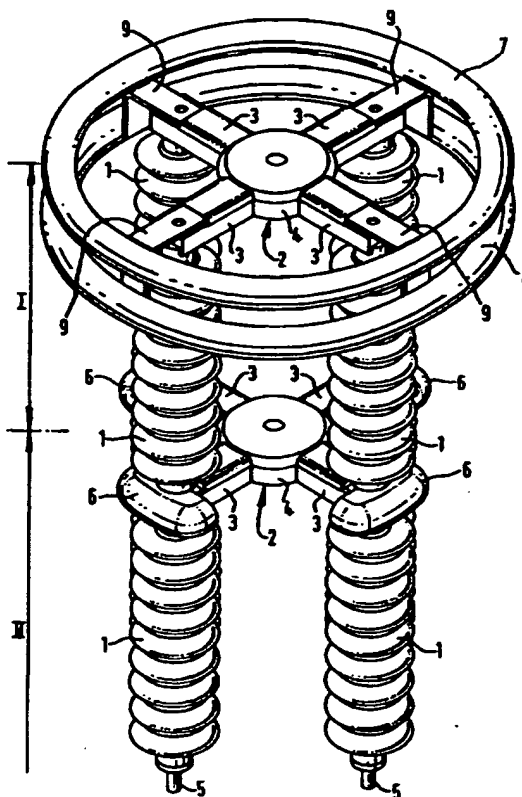
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(54) Abstract Title

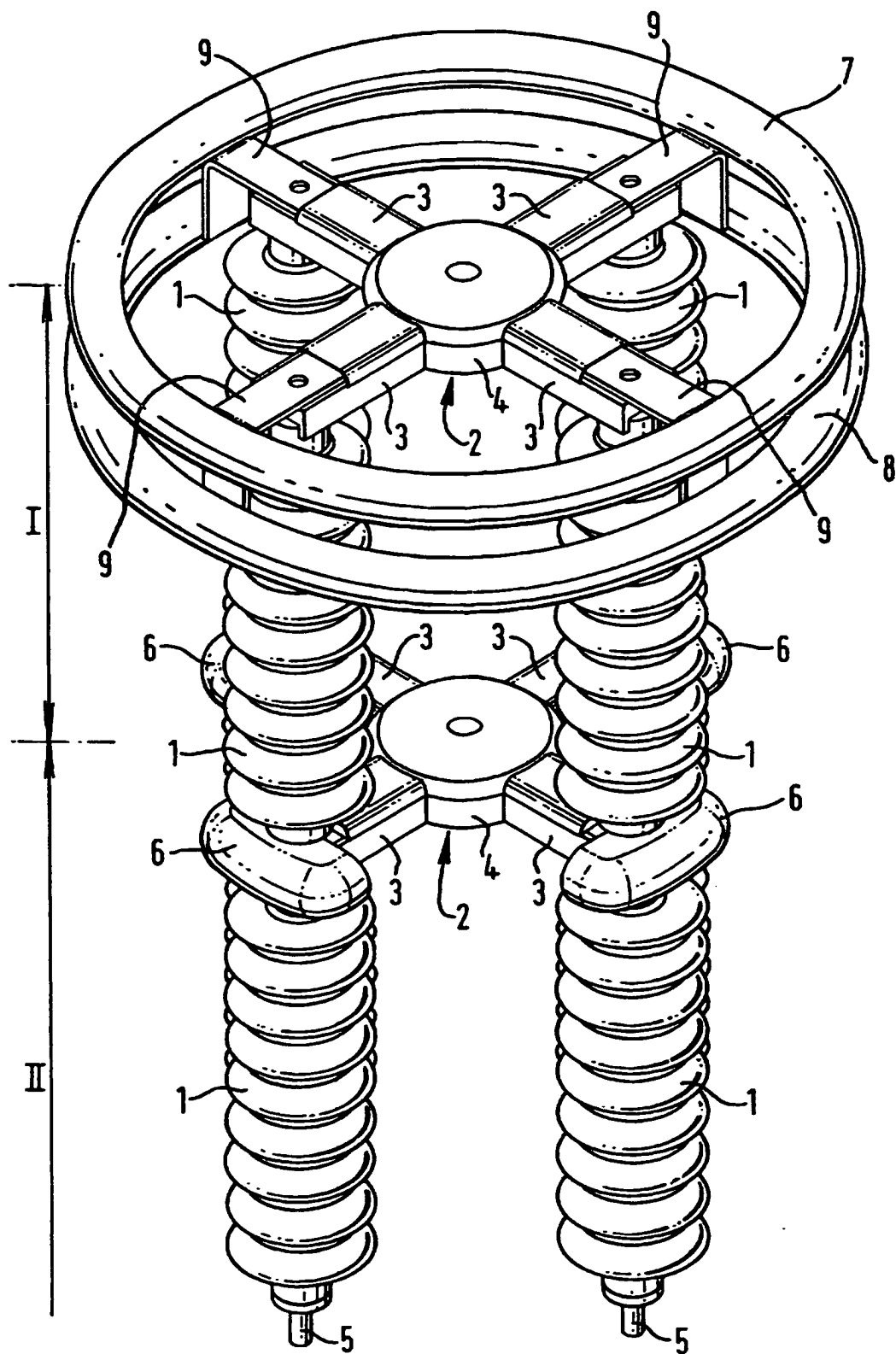
High voltage surge arrester

(57) A high voltage (station class) surge arrester comprises a plurality of serially connected stages and each stage comprises a plurality of low voltage (distribution class) polymer housed solid state surge arresters which are electrically matched. The individual surge arresters of each stage are connected together and to the respective surge arresters of an adjacent stage by means of cast metal mounting brackets (spiders) having plural equiangularly-spaced limbs to the ends of which the surge arresters are attached. Corona suppression rings are mounted at the top end of the arrester and separate corona suppression components are mounted at the ends of the limbs of the intermediate stages.



GB 2 345 203 A

1 / 1



Improvements Relating to Electrical Surge ArrestersField of the Invention:

This invention concerns improvements relating to electric surge
5 arresters, also known as surge diverters, as used in electrical power generation
and distribution systems for the safe handling of atmospherically induced
surges, arising from lightning strikes for example, and over-voltages caused
by switching operations.

Background of the Invention:

10 We pioneered the introduction of polymer housed solid-state
distribution class surge arresters, as disclosed in GB-A-2188199 for example,
and in GB-A-2230661 we proposed the utilization of a series parallel
arrangement of a plurality of such distribution class surge arresters as a station
class surge arrester. Distribution class surge arresters generally have voltage
15 ratings of the order of 24 to 36 kV and by coupling together a plurality of
electrically matched such distribution class surge arresters in a series parallel
arrangement as described in GB-A-2230661 much higher voltage ratings of
the order of 120 to 456 kV can be accommodated.

Our series parallel station class surge arrester is designed to replace the
20 conventional porcelain housed station class arrester and has been widely
acclaimed. The present invention concerns improvements in the construction
of the series parallel arrester.

Summary of the Invention:

Whereas in the series parallel surge arrester described in GB-A-2230661 the individual distribution class surge arresters of adjacent serial stages were offset from each other, the present invention proposes to provide
5 the arrester units in line throughout the series parallel arrangement. Furthermore, whereas in the surge arrester of GB-A-2230661 metal mounting plates formed integrally with corona suppression rings at their peripheries were utilized for interconnecting adjoining stages of the series parallel arrangement, the present invention proposes a more simple and cost effective
10 arrangement employing multiple-limbed brackets (spiders) in place of the mounting plates, the distal ends of the limbs being provided with corona discharge inhibiting surfaces.

The above and further features of the present invention are set forth with particularity in the appended claims and will be well understood from
15 consideration of the following description given with reference to the accompanying drawing.

Description of the Drawing:

The single figure of the accompanying drawing illustrates the upper
(top) end of an exemplary series parallel surge arrester according to the
20 present invention in perspective view.

Detailed Description of the Embodiment:

The series parallel surge arrester shown in the accompanying drawing comprises a plurality of series-connected stages I, II, etc (only the top two of which are shown) each made up of four electrically matched surge arresters 1
5 which can, for example, be of the kind described in GB-A-2188199 but could be otherwise formed so long as they exhibit sufficient structural integrity. The individual surge arresters 1 in each stage I, II, etc are coupled together and to the adjoining arresters of the next adjacent stage by means of cast metal brackets (spiders) 2 having a plurality of limbs 3 extending from a central
10 body portion 4 with even angular spacing of 90°. As can be seen, the individual surge arresters 1 of the different stages are aligned with each other.

The individual surge arresters 1 have externally screw-threaded end fixing studs 5 which enable the surge arresters to be affixed to the ends of the limbs 3 of the brackets 2, for example by provision of a double and oppositely
15 screw-threaded locking nut at the end of each limb 3 which can be turned with a spanner so as to pull the opposite ends of the respective two surge arresters together and into mounting engagement with the end of the respective limb.

Mounted at the ends of the limbs 3, after attachment of the surge arresters 1, are cast metal corona suppression bodies 6 which can for example
20 form a push fit onto the ends of the limbs 3 with close conformance around the ends of the two surge arresters 1 that are attached to the respective limb. The surfaces of the bodies 6 are smoothly curved as shown to avoid giving

rise to excessive field voltages such as might give rise to corona discharge effects.

At the top end of the series parallel arrangement, a corona suppression arrangement comprising parallel spaced-apart rings 7 and 8 which are coupled
5 to the limbs 3 of the uppermost mounting bracket 2 by means of mounting brackets 9.

The illustrated series parallel surge arrester is believed to satisfy electrical requirements and the mounting brackets 2 and their accessories, namely the corona suppression bodies 6 and the arrester fixing nuts (not
10 shown), can be manufactured at lower cost than the electrostatic mounting plates of the series parallel surge arrester described in GB-A-2230661. Furthermore, by virtue of the in line connection of the surge arresters of adjacent stages, the overall stiffness of the series parallel surge arrester can be increased as compared to that of GB-A-2230661. Otherwise the illustrated
15 surge arrester obtains all of the advantages that are described in GB-A-2230661. Modifications and variations are of course possible without departure from the spirit and scope of the invention as set forth in the appended claims; for example, the brackets 2 could have more or less limbs than the four limbs shown.

Claims:

1. A high voltage surge arrester comprising a plurality of serially connected arrester stages each of which comprises a plurality of electrically
5 matched low voltage surge arresters connected in parallel, the low voltage surge arresters of each stage being connected together and to the surge arresters of the or each next adjacent stage by means of a multiple limbed mounting bracket having corona suppression means at the end of each limb.
- 10 2. A high voltage surge arrester as claimed in claim 1 wherein at the top of the surge arrester the corona suppression means comprises at least one corona suppression ring.
- 15 3. A high voltage surge arrester as claimed in claim 1 or 2 wherein the corona suppression means at the ends of the limbs of the or each said mounting bracket supporting the ends of adjacent serial stages of the arrester comprise individual bodies associated each with a respective one of the limbs.
- 20 4. A high voltage surge arrester as claimed in any of the preceding claims which is adapted for station class operation and wherein the low voltage surge arresters are distribution class surge arresters.

5. A high voltage surge arrester as claimed in any of the preceding claims wherein the low voltage surge arresters are polymer housed solid state surge arresters.

5 6. A high voltage surge arrester substantially as herein described with reference to the accompanying drawing.



Applicati n No: GB 9828184.3
Claims searched: 1-6

Examiner: Huw Jones
Date f search: 1 December 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H2H - HAPB

Int Cl (Ed.6): H01C - 7/12, 8/04
H02H - 9/04, 9/06

Other: Online: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB2230661 A (Bowthorpe) - see fig. 3	1
A	US5444429 (Hubbell) - see figs 14-21	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.